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Effect of Storage Temperature and Packaging Material on the Quality of *Kashmiri Fireen*

Faroze Ahmad Rather[1*], Mohammad Ashraf Pal[2], Bhavna[3] and Latief Mohammad Dar[4]

[1]*Department of Livestock Products Technology, COVS, GADVASU, Ludhiana, Punjab, INDIA*
[2]*Division of Livestock Products Technology, F.V.Sc and A.H, SKUAST, Kashmir, INDIA*
[3]*Division of Veterinary Gynaecology and Obstetrics, FVSc and AH, SKUAST, Jammu, INDIA*
[4]*Department of Animal Husbandry, Govt. of Jammu and Kashmir, INDIA*

**Corresponding author: F A Rather; Email: ratherferoz510@gmail.com*

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ABSTRACT

Kashmiri Fireen is a cereal based Indian dairy product, very popular in Kashmir region of the country. *Kashmiri Fireen* was prepared from milk, wheat semolina and sugar as per pre- standardized method and packed in three different packaging materials and stored at refrigerated (4 ± 1°C) and ambient (25 ± 1°C) temperature for a period of 20 days. The product was subjected to the microbiological study and sensory evaluation at regular intervals of 5 days for determination of its storage stability. Significant variations were noticed during refrigerated storage as well as at ambient temperature in the sensory and microbiological quality of *Kashmiri Fireen*. The product exhibited progressive increase in microbial growth in terms of standard plate count, yeast and mold count and coliform count. It was observed that the product packed in aluminium foil with low density polyethylene (LDPE) laminates showed best results in terms of preservation for 20 days. The sensorial acceptability and microbiological quality of the product remained good and within the prescribed acceptability limits for 20 days at refrigerated temperature and 10 days at ambient temperature while using aluminium foil with low density polyethylene (LDPE) laminates as packaging material. The study revealed that packaging of *Kashmiri Fireen* in aluminium foil with low density polyethylene (LDPE) laminates combined with its storage at refrigerated (4 ± 1°C) temperature enabled prolonged preservation of the product for 20 days.

Keywords: *Kashmiri Fireen*, standard plate count, sensory evaluation, refrigerated, packaging

Cereal based dairy desserts involving cereals as one of their major ingredients are traditional products and are having a very long history of existence. Various traditional dairy products are famous in different regions of India and highly relished by the people of country. Kheer, falooda, satori, kaju katli and fireen are some of the products consumed by people of India. Cereal based dairy products provide considerable scope for the Indian dairy industry to diversify its processing operations in perspective of meeting the need for value addition and utilizing the market opportunities in response to the increasing demand of consumers for these products (Vijaylakshmi and Anbiah, 2010). Most of these products bear a tremendous regional importance and their production is linked to a particular cultural setting. *Kashmiri Fireen* is a traditional Kashmiri cereal based dairy dessert and the ingredients used for its preparation include milk, wheat semolina and sugar. Besides some

flavoring agents, dry fruits, coconut and garnishing material are also added (Bhat *et al.* 2010).The dessert has wide spread consumer acceptability in this region. It is being served at many festive occasions and is a common household dairy food product prepared during the holy month of Ramadhan. However, there is a lack of uniformity in the quality of this product as its manufacture involves a traditional process which is unplanned and non-standardized. Moreover, its production has been restricted to households and small shops with its quality and shelf life varying from one household to another or from one region to another considerably. This is because limited scientific study has been taken up with regard to the standardization of technology for the manufacture and estimation and prolonging of shelf life of this product.

Therefore, need is to improve the technological aspects of this product in order to develop this food with uniform quality and hygiene and enable its production at small industrial level. Sensory quality of a food product is an important property that plays great role in its wider acceptance by the people and also a major aspect in determining shelf stability of food items. Storage of a food product alters its sensory profile owing to the changes brought about by the proliferating microorganisms present in the food. Yeasts and molds are important in dairy industry as their growth in dairy products results in discoloration defects and off flavors owing to the lipolytic changes caused by these microbes (Kumar *et al.* 1975). Also their presence in dairy foods reduces their keeping quality. In this backdrop the present study was conducted to investigate the changes in organoleptic and microbiological properties of *Kashmiri Fireen* while using various packaging materials and storing it at ambient (25 ± 1°C) and refrigerated (4 ± 1°C) temperature.

MATERIALS AND METHODS

The basic ingredients used for the preparation of *Kashmiri Fireen* included milk, semolina and sugar. The product was prepared as per Rather *et al.* (2012). The prepared product was packaged in three kinds of packaging materials such as aluminium foil with LDPE laminates (T_1), craft paper with LDPE laminate (T_2) and polypropylene bag (T_3) while keeping one without packaging as a control. Each packet containing 200 grams of sample was sealed aseptically using an electric sealing machine. Four kinds of *Kashmiri Fireen* samples as stated above were stored at ambient (25±1°C) and refrigerated (4±1°C) temperature for a period of 20 days. Samples were subjected to microbiological analysis at 5 days interval for standard plate count, yeast and mould and coliform counts as per Indian Standards, SP: 18-Part (XI, 1980).

The organoleptic quality was evaluated by a panel of 10 experienced judges on the basis of a 9 point Hedonic scale. The product was evaluated for appearance, flavor, texture and consistency and overall acceptability. Results were analysed statistically using Kruskal-Wallis test and ANOVA with significance level of 0.05 ($p<0.05$) as outlined in Statistical Methods (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Sensory quality

As is evident from Fig. 1, representing effect of storage on appearance of *Kashmiri Fireen* at ambient (25 ± 1°C) and refrigerated (4 ± 1°C) temperature, the appearance of samples did not show significant change ($p< 0.05$) in mean scores awarded by the panelists at ambient (25 ± 1°C) temperature.

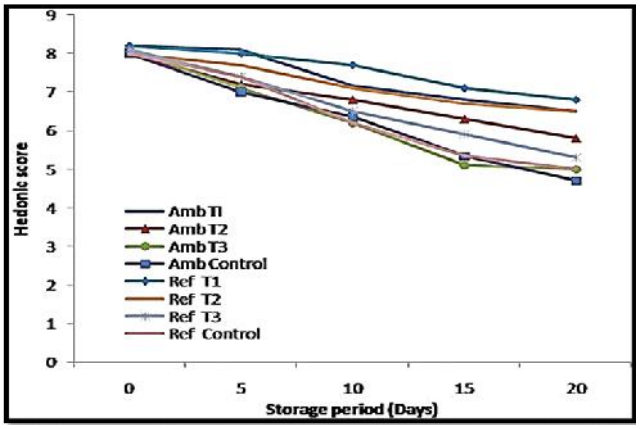

Fig. 1. Effect of storage temperature and packaging material on appearance of *Kashmiri Fireen*

T_1: aluminium foil with LDPE laminates, T_2: craft paper with LDPE laminates, T_3: polypropylene, Amb: ambient temperature (25 ± 1°C) and Ref: refrigerated temperature (4 ± 1°C).

Sample packed in aluminium foil with LDPE laminates was relatively awarded higher scores than other treatments which got higher scores than control samples. Control sample was awarded lowest scores from 5 days of storage. Moreover, there was a further progressive decrease in the appearance scores awarded to control samples from 5 days of storage owing to the syneresis exhibited by these samples. Syneresis was attributed to higher bacterial growth in control at ambient temperature and subsequent increase in acidity (Fox *et al.* 2000; Panesar and Shinde, 2011). Similar findings have also been reported by Usha *et al.* (2005); Geetha

and Rao (2008); Gaikward and Hembade (2012) in various traditional dairy products. With regard to the storage of *Kashmiri Fireen* at 4 ± 1°C, it was observed that the appearance of samples was not affected significantly ($p<0.05$), thereby, no changes were observed in scores awarded by the panelists. The higher scores awarded to aluminium foil with LDPE laminates can be attributed to its more resistance to the growth of bacteria and due to its high keeping quality. Similar results were obtained by Osman *et al.* (2009); Bhat *et al.* (2010).

As delineated by Fig. 2 the flavor of *Kashmiri Fireen* was observed to deteriorate throughout the length of storage at ambient (25 ± 1°C) and refrigerated (4 ± 1°C) temperature. The rate of flavor deterioration was higher at ambient temperature and more rapid for control samples. All the treatments were awarded nearly equal scores on 0th day. As the storage progressed it was observed that at ambient (25 ± 1°C) temperature, flavor score also decreased on and from 5th day onwards in all treatments.

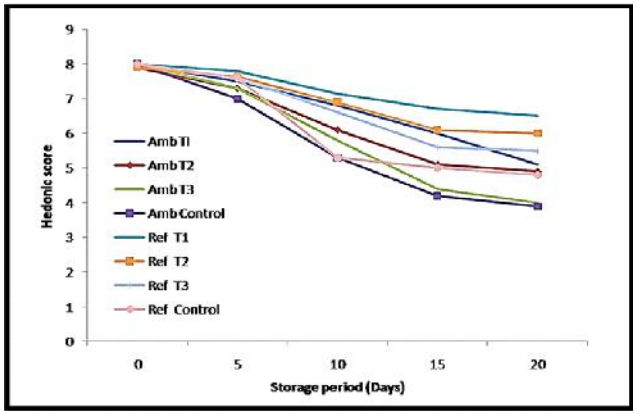

Fig. 2. Effect of storage temperature and packaging material on flavor of *Kashmiri Fireen*

T_1: aluminium foil with LDPE laminates, T_2: craft paper with LDPE laminates, T_3: polypropylene, Amb: ambient temperature (25 ± 1°C) and Ref: refrigerated temperature (4 ± 1°C).

However, the decline in flavor score was lower in all treatments except control samples. Among all treatments samples packed in aluminium foil with LDPE laminates was given highest flavor scores owing to its relatively higher resistance against the growth of bacteria. The decline in flavor score can be attributed to the increased production of free fatty acids (FFA) and increase in acidity as proposed previously by Prasad *et al.* (1989); Adhikari and Singhal (1992); Chavan *et al.* (2009); Acharya and Agarwal (2010); Gaikward and Hembade (2012). Moreover, during the length of storage at ambient temperature slight rancidity was observed in control sample on 5th day owing to the lipolysis caused by lipase enzyme secreted by bacteria (Pal and Gupta, 1985). Gaikward and Hembade (2012) also observed development of rancidity in Ujain basundi over its storage. At refrigerated temperature the flavor scores awarded to all treatments did not show significant ($p<0.05$) difference. All the packaged samples were observed to exhibit insignificant deterioration in flavor up to 15 days of storage with T_1 being awarded highest flavor score than other treatments. While as significant ($p<0.05$) decrease in flavor score was observed in case of control sample from 10th day onwards. The decline in flavor score after 15 days in case of packaged samples and 10 days in control sample can be attributed to sharp rise in free fatty acid (FFA) value and acidity (Acharya and Agarwal, 2010).

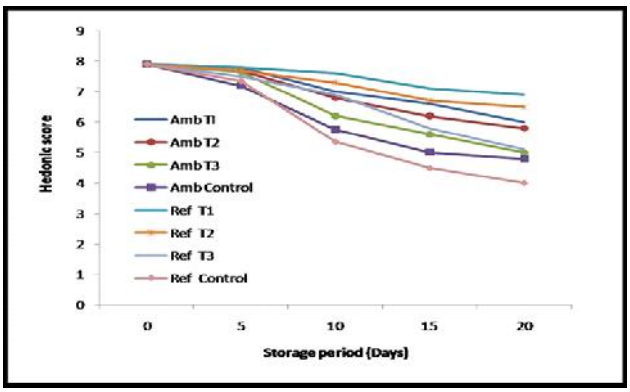

Fig. 3. Effect of storage temperature and packaging material on texture and consistency of *Kashmiri Fireen*

T_1: aluminium foil with LDPE laminates, T_2: craft paper with LDPE laminates, T_3: polypropylene, Amb: ambient temperature (25 ± 1°C) and Ref: refrigerated temperature (4 ± 1°C).

As is evident from Fig. 3 texture and consistency of *Kashmiri Fireen* was seen to have been influenced for all treatments during its storage at ambient (25 ± 1°C) and refrigerated (4 ± 1°C) temperature. Storage of samples at ambient temperature (25 ± 1°C) resulted in significant ($p<0.05$) decrease in mean scores for texture and consistency. The highest score was awarded to aluminium foil with LDPE laminates while as control sample got lowest value of texture and consistency than craft paper and polypropylene treatment samples. This might be attributed to moisture loss during storage due to which product became thicker. Also, syneresis as mentioned above was observed in control sample on 5th day which resulted in formation of water layer on its surface and thereby decline in its score. The storage of *Kashmiri Fireen* at refrigerated (4 ± 1°C) temperature was also seen to have affected texture and consistency significantly ($p<0.05$). However, rate of decline was slower than at ambient (25 ± 1°C) temperature.

Aluminium foil with laminates treatment was awarded highest scores than craft paper with laminates and polypropylene treatments which got higher scores than control sample. This might be attributed to moisture loss which resulted in thicker product. Present findings are in agreement with the previously authored research (Usha *et al.* 2005; Acharya and Agarwal, 2010; Gaikward and Hembade, 2012).

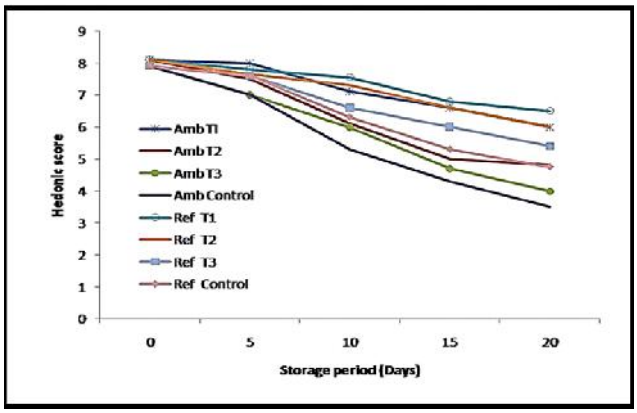

Fig. 4. Effect of storage temperature and packaging material on overall acceptability of *Kashmiri Fireen*

T_1: aluminium foil with LDPE laminates, T_2: craft paper with LDPE laminates, T_3: polypropylene, Amb: ambient temperature (25 ± 1°C) and Ref: refrigerated temperature (4 ± 1°C).

As delineated in Fig.4 it was observed that the overall acceptability scores remained around liked very much to liked slightly throughout the storage period of 20 days for the samples packed in aluminum foil with LDPE laminates where as it remained little lower for other packaged samples at refrigerated temperature. It indicates that at refrigerated (4 ± 1°C) temperature the product packaged in aluminium foil remained sensorial acceptable for 20 days when stored at. However, sensory quality of control samples was seen to get influenced significantly by refrigerated storage and from 10th day of storage sensory quality of control samples showed signs of deterioration as reflected by the scores. The finding conforms to Bhat *et al.* (2010) who found that refrigerated storage had no significant effect on sensory quality of Kashmiri Saffron Phirni up to seven days of storage. The storage of *Kashmiri Fireen* at ambient (25 ± 1°C) temperature resulted in significant decrease in overall acceptability scores and it was found that the product remained sensorial acceptable up to 10 days when packed in aluminum foil with laminates.

However as implied from the above mentioned findings sensorial acceptability of control samples at ambient (25 ± 1°C) temperature was seen to deteriorate from 3rd day of its storage as can be deduced from overall acceptability scores depicted in Fig. 4.

Microbial Quality

Standard plate count

The results pertaining to the standard plate count of Kashmir Fireen is delineated in Table 1. It was observed that irrespective of the packaging material all treatments upon storage at ambient (25 ± 1°C) temperature resulted in microbial proliferation owing to the high water activity (0.73) of the product. As indicated in above mentioned table there was progressive increase in the standard plate count of *Kashmir Fireen* samples during storage. However, the increase of standard plate count was more rapid in control sample as compared to other treatments. Further, all packaging materials were seen to resist microbial contamination for five days at ambient (25 ± 1°C) temperature. Moreover, the sample packed in aluminum foil with laminates showed comparatively lesser microbial growth and it was found that at ambient (25 ± 1°C) temperature the aluminium foil exhibited better results in terms of preventing microbial growth in a sample till later stages. The craft paper with LDPE and polypropylene packaging materials showed higher increase in SPC as compared to aluminium foil but it showed better resistance to the growth of microbes than the control which exhibited innumerable SPC on 15th day of storage of the product at ambient (25 ± 1°C) temperature. Landge (2006) reported similar effects on milk cake. These results also compliment the findings of other researchers (Kumar *et al.* 1975; Mandkhot and Chandramani, 1984).

As depicted in Table 1 it was observed that unlike at ambient (25 ± 1°C) temperature the samples stored under refrigerated (4 ± 1°C) temperature restricted the growth of microorganisms for prolonged period. At refrigerated (4 ± 1°C) temperature microbial growth was observed first in control followed by treatment T_3 (polypropylene) and treatment T_2 (craft paper). However, samples packed in aluminium foil with LDPE laminates were observed to resist microbial colonies development for 5 days, which was found to be significant considering the microbial quality of *Kashmiri Fireen*. As could be deduced from comparative appraisal of standard plate counts of all treatments the slowest growth was observed in the aluminum foil with LDPE laminate while as the control sample was seen to have highest growth rate.

Whereas the polypropylene and craft paper packages resulted in incalculable standard plate count on 20th day, the control showed innumerable growth on 15th day. On 20th day the lowest standard plate count was given by aluminium foil with LDPE laminate. The study implied that at refrigerated (4 ± 1°C) temperature the

Table 1. Effect of storage period on standard plate count in *Kashmiri Fireen* at ambient (25 ± 1°C) and refrigerated (4 ± 1°C) temperature

Treatment	Temperature	Storage period (days) (CFUg^{-1})				
		0	5	10	15	20
T_1	Ambient	2.7×10^2	5.4×10^2	2.9×10^4	4.6×10^4	—
	Refrigerated	2.3×10^2	3.7×10^2	8.6×10^2	4.0×10^3	9.0×10^3
T_2	Ambient	3.0×10^2	7.8×10^2	3.1×10^4	NP	NP
	Refrigerated	2.8×10^2	4.3×10^2	7.0×10^3	1.1×10^4	4.0×10^5
T_3	Ambient	3.1×10^2	3.3×10^3	2.1×10^5	NP	NP
	Refrigerated	3.0×10^2	4.6×10^2	7.3×10^3	2.3×10^4	NP
Control	Ambient	3.4×10^2	7.3×10^3	4.7×10^5	NP	NP
	Refrigerated	3.3×10^2	4.8×10^2	8.0×10^4	NP	NP

T_1: Aluminium foil with LDPE laminate,T_2: Craft paper with LDPE laminate, T_3: Polypropylene NP: Not performed

Table 2. Effect of storage period on yeast and mould count in *Kashmiri Fireen* at ambient (25 ± 1°C) and refrigerated (4 ± 1°C) temperature

Treatment	Temperature	Storage period (days) (CFUg^{-1})				
		0	5	10	15	20
T_1	Ambient	3	17	73	3.3×10^2	3.6×10^4
	Refrigerated	2	9	19	55	2.1×10^2
T_2	Ambient	7	90	3.9×10^2	6.7×10^3	NP
	Refrigerated	6	28	1.1×10^2	9.3×10^2	5.1×10^3
T_3	Ambient	4	3.3×10^2	4.1×10^3	7.6×10^4	NP
	Refrigerated	5	1.2×10^2	6.3×10^2	1.9×10^3	4.7×10^3
Control	Ambient	6	3.8×10^2	9.1×10^3	NP	NP
	Refrigerated	3	1.3×10^2	1.1×10^3	NP	NP

T_1: Aluminium foil with LDPE laminate T_2: Craft paper with LDPE laminate T_3: Polypropylene, NP: Not performed

Table 3. Effect of storage period on coliform count in *Kashmiri Fireen* at ambient (25 ± 1°C) and refrigerated (4 ± 1°C) temperature

Treatment	Temperature	Storage period (days) (CFUg^{-1})				
		0	5	10	15	20
T_1	Ambient	0	0	0	0	0
	Refrigerated	0	0	0	0	0
T_2	Ambient	0	10	27	1.3×10^2	1.7×10^2
	Refrigerated	0	0	5	17	1.1×10^2
T_3	Ambient	0	23	1.6×10^2	NP	NP
	Refrigerated	0	7	90	1.6×10^2	2.1×10^2
Control	Ambient	0	1.1×10^2	1.7×10^3	NP	NP
	Refrigerated	0	80	1.1×10^2	1.7×10^3	2.9×10^4

T_1: Aluminium foil with LDPE laminate,T_2: Craft paper with LDPE laminate,T_3: Polypropylene NP: Not performed

quality of *Kashmiri Fireen* can be preserved for 20 days when packed in aluminium foil with LDPE laminates. Current findings are in the line of various researchers (Acharya and Agrawal, 2010; Landge, 2006; Gaikward and Hembade, 2012). These results are also in conformity with Kumar *et al*. (1975) who studied the shelf life of khoa and found increase in SPC after one week at 8°C and 37°C.

Yeast and mold count

The data pertinent to yeast and mold count is delineated in Table 2. As is evident from table, greater variation was observed among all treatments with regard to yeast and mold count at ambient temperature. Idris and Alhasan (2010) also reported same findings while studying effect of packaging materials on microbiologic properties of Sudanese white cheese. The data presented in Table 2 clearly elucidate that all packaging materials exhibited inhibitory effect on the growth ofyeast and mold and enhanced the keeping quality of *Kashmiri Fireen*. Treatment T_1 showed very few numbers of yeast and molds and less than the craft paper and

polypropylene packages. The highest yeast and mold count was observed in control and control sample was observed to get spoiled on 5th day of storage at ambient temperature. These findings are in conformity with the results as obtained on milk cake (Landge, 2006). These results also conform to the findings of researchers (Kumar *et* al. 1975; Dwarkanath and Srikanta 1977; Birader *et al.* 1985).

As revealed in Table 2, it was observed that the yeast and mold count in *Kashmiri Fireen* increased as the storage time progressed. Among all treatments aluminium foil with LDPE laminates exhibited greater resistance against the growth of yeast and mold during storage while as control and polypropylene showed rapid growth and maximum number of yeast and mold within a short span of storage period. The resistance shown by the aluminum foil against yeast and mold growth might be attributed to its noninterference with limited oxygen availability inside of the pack (Landge, 2006). On 10th day of storage there was development of molds on the surface of the control and polypropylene packaged sample. Similar results were reported by workers (Rao *et al.* 1977; Landge, 2006).

Coliform count

Table 3 shows the data pertinent to changes in coliforms in *Kashmiri Fireen* during storage. The investigation revealed that all the packaging materials employed were effective in controlling the coliform growth of *Kashmiri Fireen* to a larger extent. The initial level of coliforms was found to be zero in all packages as well as in control. In control sample it reached to 1.1×10^2 CFU g^{-1} and 1.7×10^3 CFU g^{-1} on 5th and 10th day respectively, at ambient temperature. Aluminium foil with LDPE laminates showed zero level of coliforms throughout its storage period while coliform count in craft paper and polypropylene packages displayed progressive increase from initial level of zero during storage; however, the count was less than the control. This might be attributed to post manufacture contamination. Further, throughout the storage period no colonies of coliforms were found in any of the samples of *Kashmiri Fireen*. The might be due to high heat treatment during its preparation and no post manufacture contamination. Similar results were obtained previously by Arora *et al.* (1991); Landge (2006); Idris and Alhasan (2010).

CONCLUSION

From the above discussed findings it can be deduced that packaging and refrigerated storage enhance shelf life of *Kashmiri Fireen*. Aluminium foil with laminates showed best results with regard to the product remaining sensorial acceptable for 20 days when stored at refrigerated (4 ± 1^oC) temperature. Similarly, shelf life of *Kashmiri Fireen* was also extended at ambient (25 ± 1^oC) temperature by using aluminium foil with laminates as packaging material. However, shelf life stability and sensorial acceptability of the product was maintained for 10 days at ambient temperature as compared to refrigerated storage. Hereby, the study implies that in order to produce *Kashmiri Fireen* at industrial level and for its prolonged preservation, aluminium foil with LDPE laminates combined with the refrigerated storage of the product should serve the purpose.

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REFERENCES

Acharya, P.P. and Agrawal, J. 2010. Effect of packaging materials and modified atmosphere packaging on the shelf life of khoa. *Nepal J. Sci. Technol.*, **11**: 87-94.

Adhikari, A.K. and Singhal, O.P. 1992. Effect of heat resistant microorganisms on the fatty acid profile and organoleptic quality of UHT milk during storage. *Indian J. Dairy Sci.*, **45**: 72- 277.

Arora, K.L., Chander, H. and Ram, J. 1991. Chemical and microbiological quality of kalakand sold in the market. *Asian J. Dairy Res.*, **10**: 96-102.

Bhat, Z.F., Pathak, V., Ahmed, S.R. and Bukhari, S.A.A. 2010. Development of Kashmiri Saffron Phirni from reconstituted skim milk. *Beverage Food world.*, **37**: 81-84.

Biradar, U.S., Dev, D.K. and Ingle, U.M. 1985. Shelf life extension of pedha by packaging. *J. Food Sci. Technol.*, **50**: 51-55.

Chavan, R.S., Prajapati, P.S., Chavan, S.R. and Khedkar, C.D. 2009. Study of manufacture and shelf life of Indian dietetic and diabetic rosogolla. *Int. J. Dairy Sci.*, **4**: 129-141.

Dwarkanath, C.T. and Srikanta, S. 1977. Studies on the microbiological quality of traditional Indian sweetmeat products. *J. Food Sci. Technol.*, **14:** 201-204.

Fox, P.F., McSweeney, P., Cogan, T.P. and Guinee, T.M. 2000. Fundamentals of Cheese Science. Ist Edn., Springer, New York, ISBN-10: 0834212609.

Gaikward, S.M. and Hembade, A.S.2012. Effect of storage temperature on microbiological quality of

standardized cow milk Ujain Basundi. *Int. J. Dairy Sci.*, **7**: 34- 42.

Geetha, P. and Rao, K.J. 2008. Technology of retort processed poppy seeds payassam, 2. Shelf life studies. *J. Food Sci. Technol.*, **45**: 534-536.

Idris, Y.M.A. and Alhasan, I.H. 2010. Effect of packaging material on microbiological properties of Sudanese white cheese. *Int. J. Dairy Sci.*, **53**: 128-134.

Indian Standards, SP: 18-Part XI. 1980. Handbook of Food analysis. *Bureau of Indian Standards*, New Delhi, India.

Kumar, A., Rajorhia, G.S. and Srinivasan, M.R. 1975. Effect of modern packaging materials on the keeping quality of khoa. *J. Food Sci. Technol.*, **12**: 172-177.

Landge, S.N. 2006. Studies on standardization and packaging of milk cake. Ph.D. Thesis, Swami Ramanand Teerth Marathwada University, Nanded (Maharashtra).

Mandkhot, U.V. and Chandramani, N.K. 1984. Incidence of food poisoning organisms through indigenous dairy products. *Indian J. Med. Res.*, **77:** 190-193.

Osman, M., Abdulla, M. and Mohamed, S.N. 2009. Effect of storage period on chemical composition and sensory characteristics of vacuum packaged white soft cheese. *Pak J. Nutr.*, **8**: 145-147.

Pal, D. and Gupta, S.K. 1985. Sensory evaluation Indian milk products. *Indian Dairyman*, **37**: 465-474.

Panesar, P.S. and Shinde, C. 2011. Effect of storage on syneresis, pH, Lactobacillus acidophilus count, Bifidobacterium bifidum count of Aloe vera fortified probiotic yoghurt. *Current Research in Dairy Sciences*, Knowledge Review, Malaysia, ISSN: 1994-5434.

Prasad, C., Prasad, S. and Singh, M.D. 1989. Physicochemical changes in evaporated milk during manufacture and storage. *Indian Dairyman.*, **41**: 505- 508, 553.

Rao, O.V., Singh, S. and Surjan, S. 1977. Effect of packaging materials on the keeping quality of khoa. *J. Food Sci. Technol.*, **14**: 152-156.

Rather, F.A., Pal, M.A., Khan, S.U. and Jalal, H. 2012. Preparation of ready to mix semolina milk pudding-*Kashmiri Fireen*. *Int. J. Food Nutri. safety.*, **2**: 46-54.

Snedecor, G.W. and Cochran, W.G. 1994. Statistical Methods. 6th Edn, IOWA State University Press, USA.

Usha, B., Monica, G., Sandhu, K.S., Preeti, A. and Sohata, P.P. 2005. Changes in physico- chemical, sensory and microbiological characteristics during storage of carrot milk cake in various packages. *J. Food Sci. Technol.*, **42**: 119-126.

Vijaylakshmi, R. and Anbiah, S.V. 2010. Cereal based dairy foods. *Indian Dairyman.*, **62**: 62- 67.